plane
GRUMMAN
news

'Deepest thanks'

The Apollo 13 crew wants to express to the entire Grumman engineering and manufacturing team our deepest thanks for building a most outstanding spacecraft. Aquarius performed beyond expectations in providing our only means of returning home.

Our highest praise for the continuous efforts of all the Grumman employees in the making of LM-7.

Jim Lovell
Jack Swigert
Fred Haise

BULLSEYE!

The world heaved a sigh of relief.

Relief held hands with the unbelievable. Even now, a week later, that aura persists: Yes, it happened: The astronauts splashed down safely in a pacific Pacific, and millions and millions saw it and heard of it; yet, somehow . . . there's an air of the unreal about it. . . .

It's mystical, wispy, and beguiling. And it's also as hard and real as Georgia marble or Gibraltar or the great Pyramids of Egypt.

There seems to be a believability gap—*except* for those who are close to the Apollo program. With them there is a calm confidence bred of knowledge. To them, the great wringing of hands was an over-reaction. As one of them in Bethpage's Mission Support Room remarked:

"We felt we had the problem in hand. Contingency plans have been gone over for years, and even though we didn't expect this particular problem to arise, we knew how to tackle it."

He went on to indicate that the "only real worry" was an *if:* if another problem of similar magnitude took place on that flight. It didn't.

(Continued on page 4)

Vol. 29, No. 8, Bethpage, N. Y., April 24, 1970

(Wide World photo)

They watch what they say— and keep their eyes on safety

A fun-loving group from Surfaces & Assembly in Plant 36 listened carefully to a safety discussion—or did they? No, not these; they watched.

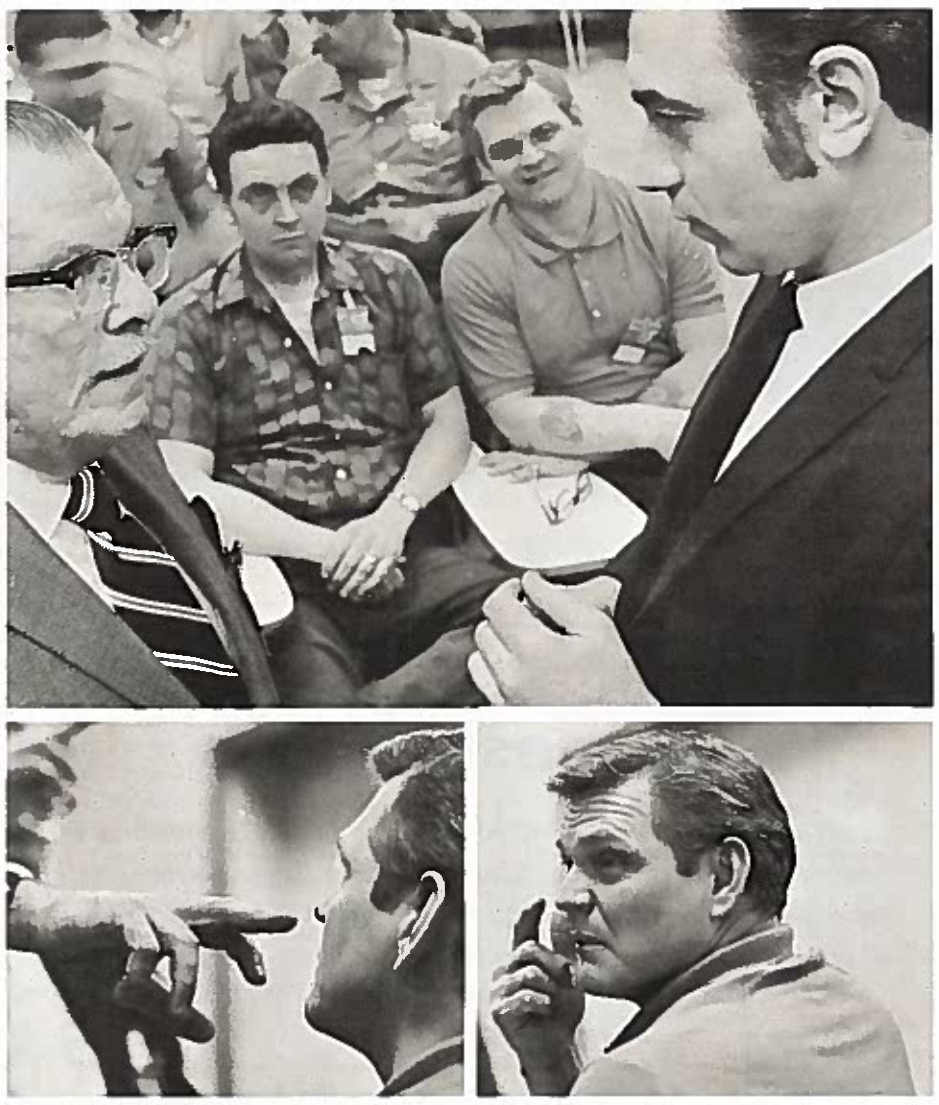
Grumman has eight men working in Plant 36 who are deaf. And because they have never heard themselves, or anyone else, speak, they do not speak in a normal way. But they communicate—make no mistake about that. With each other they explode into animated sign language, and all eight are accomplished in lipreading also.

To make sure these eight were provided with the facts and instructions necessary for personal safety on the job and around the plant, Bob McCartney of Corporate Safety called them together recently and invited Alexis Piacentine of Surfaces & Assembly, Plant 3, to "interpret" his message. Piacentine is also deaf, but he has taken speech courses and can make himself understood by a hearing person. As for communicating with the group, he and they easily talked up a storm. McCartney got his safety discussion across via sign language and the men's ability to read lips, and what was equally important, Alexis drew out their reactions and their own suggestions for safe practices in the shop.

After showing the safety equipment and discussing, through Piacentine, the ideas the men had, McCartney declared, "These are the most receptive people I have ever worked with."

Bill McLean, Plant 36 manager, notes that safety is not an isolated "area of excellence" for these eight. "Their workmanship in Department 046, and their good attendance and all-around ability, are recognized by all levels of supervision in Plant 36. We're very proud of them," he said.

Grumman employs deaf and mute persons in other plants, too, and they also have good safety records. They will eventually be included in the program arranged by Corporate Safety.



Two-way class. Alexis Piacentine (top R) reads Bob McCartney's lips, then, in sign language, passes safety message along to eight deaf and mute men in Plant 36. Cliff Seifried (below) offers return ideas. (Photos by Bob Settles)

Short shots

The great amount of effort required of the scoutmaster of a big Boy Scout troop has faded into the background for George (Bob) Crockett of Tool Control, Plant 2. His 62 Scouts have earned L. I. Catholic Scouting's most coveted honor, the Bishop's Troop Award, for proficiency in Scouting and service to their sponsoring institution. Crockett's troop is from the Lynbrook-East Rockaway area, and it meets at St. Raymond's School. . . . Board Chairman Clint Towl has been named as chairman of the Human Resources Center's fourth annual celebrity sports night. Proceeds of the $100 per plate dinner, scheduled for April 29, will go to the center which is active in providing training, rehabilitation, and research for severely handicapped and retarded young people and adults. . . . At the annual meeting of the Aircraft Manufacturers Association, Inc., in New York City last month, Mel Gill of the Legal Department was elected to the organization's Board of Directors. The Association administers the patent cross-licensing agreement for the aircraft industry in the United States.

John Marek of Presentations Services, Plant 5, named "Senior of the Year" by the Suffolk County Civil Air Patrol. Marek, who has been in the CAP for only 1½ years, is a lieutenant in the Suffolk auxiliary of the Air Force and serves as operations officer for the local unit. . . . Bill Bennett of Lathes and Mills, Plant 2, may seem to be walking a little taller these days. His son Bill, who won a world rowing championship a couple of years ago, has been appointed to Annapolis, and his daughter is now a Naval officer. . . . New appointment for Joe Ryan: assistant director of Contracts, responsible for all Contracts Central Pricing activities and reporting to Rolf Larson, deputy director of Contracts. Ryan is in Plant 5, Ext. 7305. . . . At an AIAA conference on "Test Effectiveness in the '70s," held in Palo Alto, Calif., Apr. 1-3, Steve Tsontakis of Grumman and Toni Licardi of NASA Headquarters in Washington, D. C., presented a paper on the topic, "Lunar Module Test Program Management Approach." Tsontakis is working on the Space Shuttle Proposal Program, Plant 25. Licardi was formerly the assistant manager of RASPO (Resident Apollo Spacecraft Program Office) at Bethpage. The AIAA Program attracted 800 engineers.

Grumman Data Systems names Tom Genovese General Counsel

Tom Genovese, who was a member of the legal staff of Grummam Aircraft from October 1966 to May 1969 and of Grumman Corporation from then until January 1, 1970, is now General Counsel and Assistant Secretary of Grumman Data Systems. His office is in Plant 41, in Melville, Ext. 2126.

Genovese is a graduate of the University of Virginia, class of '57. He received his law degree from Fordham University School of Law and is a member of the New York State Bar Association. The Masons, the PTA of Park Avenue School in Albertson, and the presidency of a citizens committee concerned with local school administration are some of his extracurricular pursuits.

Tom Genovese

Genovese was an attorney with the Federal Aviation Agency for six years and for a year with the National Broadcasting Company. He and his wife, Irene, have two daughters, Torene and Andrea, ages 9 and 7. When he has a chance to pull away from his community and job responsibilities, he and some friends hire a boat and go deep-sea fishing.

These Grumman Data Systems appointments were announced last month: William H. Mueller, director, Technical Programming; Gregory DiBenedetto, manager, Real Time Systems Programming; Donald J. Ball, manager, Applied Scientific Programming; Martin C. Blyseth, manager, Technical Applications Marketing Support.

Also, Dominic J. DiFalco, director, Test Data Programming; Augustus Josepher, manager, Bethpage Test Data Programming; William Rizzardi, manager, Calverton Test Data Programming.

James M. Conners, Vice President – Operations, named John Sachleben as his technical assistant. Sachleben is at Plant 41, Ext. 2945.

OBITUARIES

EUGENE R. WILLIAMS of Critical Material Control, Plant 17, died April 7 at the age of 40. He had been with the Company four years, and he lived at 218 Tree Rd., Centereach.

JOSEPH L. COLONGIONE of Controls, Plant 29, died April 8. He was 53 years old and had been with Grumman 24 years. His home was at 298 Woodlawn Ave., St. James.

EUGEN JEFIMOW died April 11 at the age of 42. He worked in Vehicle Drafting, Plant 1, and had been with Grumman since 1964. His home was at 4122 Paulding Ave., Bronx.

HERBERT A. CORKEY of P/S Electro Mechanical Design, Plant 35, died April 12 at the age of 58. He had been with the Company since 1965, and he lived at 33 E. Iroquois St., Massapequa.

CHARLES H. CARMAN JR. died April 13 at the age of 47. He had worked in Plant 5 Machine Shop and had been with Grumman nearly 13 years. He lived at 18 Goldsmith Ave., Greenlawn.

EUGENE MARCELLO of Transportation, Plant 20, died April 13. He was 57 years old and had been with the Company four years. His home was at 16 Adams St., Farmingdale.

Tick off EA-6B program goals on way to first production run

Grumman's supersensitive electronics countermeasures aircraft, the EA-6B, is ticking off the goals that appear to indicate on-time delivery, next January, of the first production aircraft. BIS (Board of Inspection and Survey) trials are due to begin May 1 at NATC, Patuxent River. Navy Preliminary Evaluation of the avionics systems was completed successfully at Calverton last month.

The final test of the command sequenced ejection system sled tests was completed successfully at China Lake, Calif., on March 12. This unique escape system permits the four-man crew to clear the airplane at low speed and altitude without mutual interference in just over two seconds.

Vice President Bob Miller, Program director, reports that "$51 million in long lead time funding has been received so far for our Fiscal Year 1970 production contract."

Production on the EA-6B wing outer panel assemblies is just getting under way at Plant 3, and a number of fuselage assemblies for the first production airplanes are in the jigs at Plant 27. Fabrication of production tactical jamming systems is well along at the plants of electronic suppliers.

Escape system. **EA-6B required extensive testing of sequenced system for ejecting pilot and three electronic counter-measure officers (ECMOs) to prove that men and seats would not become entangled in emergency ejection. Speeds of 130-600 knots are achieved on China Lake test track, using dummies in simulated EA-6B cockpits on rocket-propelled sled. (Navy photo)**

Readying new Hawkeye for Navy

The Grumman E-2C is ready and waiting.

Progress on the development of Grumman's most advanced airborne early-warning aircraft has reached the stage where Department of Defense representatives have taken a close look at the system and have been briefed on its capabilities.

This group, headed by Brig. Gen. Vern Turner (USAF), scanned the E-2C last week, and is preparing reports for the Defense Systems Acquisition Review Council (DSARC). The Council, composed of assistants to the Secretary of Defense, meets May 21, and will forward recommendations to Defense Secretary Melvin Laird on funding of the E-2C production program.

Accompanying Gen. Turner were Al Nye, Maj. John Aherne (USAF), and Col. Pat Kay (USAF). Also attending the briefings were Capt. Jos Pariseau, Navy Project Manager for the E-2C, Cdr. Hank Bowers of the Navy Project office, and Maj. Thomas Neale, an Air Force Flight Safety officer.

The visitors were greeted by Senior Vice President Bill Zarkowsky, Bill Barnard, E-2C Program manager, and Julie Cohen, E-2 Program director.

They visited Plant 4 to view the two E-2A's that are being modified into E-2C flight test vehicles, and the full-scale lines-run mockup; attended an extensive program briefing in Plant 34; inspected the ATDS (Airborne Tactical Data System) in Plant 14; and also visited Hazeltine, a major sub-contractor that will supply the display sub-system and detection processor.

The DSARC aides will also visit the West Coast for inspection tours at Garrett and Litton Data Systems in Los Angeles, and at Dalmo Victor in San Francisco, which will supply the E-2C rotordome. Garrett will supply the equipment cooling system, and Litton the computer programmer. Following that they will visit General Electric at Utica, N. Y. GE will provide the radar system and radar detection processor.

The group then will make an evaluation of the E-2C, its current status, and production capabilities.

The E-2C is an AEW aircraft similar in appearance to the E-2A, with few outward changes in the airframe. But it will have a completely new avionics system, will have a higher availability rate, will be able to fly more varied missions, and will have a far greater detection capability.

Fly first modified A-6 tanker

The KA-6D tanker program is "off the ground."

First flight of the modified A-6 Intruders was made on Thursday, April 16, and four successful dry hookups were reported in the tests at Calverton.

The first four A-6's to be modified into aerial tankers under the present Navy contract are being fitted with four external wing fuel tanks, plus one tank under the center fuselage to hold a backup refueling system. The KA-6D's have an 11-ton capacity of JP-5 fuel and have a capability of refueling any of the fighter and attack aircraft in Fleet service.

Pilot of the first KA-6D in flight was Chuck Sewell, with Dave Cooke as bombardier-navigator. The two receiving A-6's in the test were piloted by Bob Smyth and Joe Burke.

Although much of the old weapon system is removed to accommodate the new equipment in the modified Intruders, capabilities for visual daylight bombing are being retained in the aircraft.

Ron Peterson is the KA-6D Program manager, with Fred Treubig serving as his assistant.

Inside view of corporate life

A couple of weeks ago, 42 officers from the Air Force Institute of Technology's Education with Industry Program got an intimate view of Grumman activities during a one-day session coordinated by the Training and Development Department. The day-long discussions, which ranged from corporate philosophy through engineering, production, and marketing, involved some of the top men in the Company, including Senior Vice President Bill Zarkowsky, Vice Presidents Corky Meyer, Gordon Ochenrider, Jim Zusi, and Alex Alexandrovich, Director of Contracts Pete Oram, Consulting Pilot Dick Sprague, Joe Newman, and Arnie London.

The Air Force visitors participating in the Education with Industry Program are on 10 months' assignment at various aerospace companies on the East Coast. When they complete the training in industrial procurement, they usually are assigned as Air Force representatives at industrial facilities.

Earlier this month, 22 men from Naval repair facilities completed a two-week training course on titanium at Bethpage. It was the first such course to be offered in the aerospace field, says Gus Lanzo, deputy director of Training and Development, and included welding, adhesive bonding, cleaning, descaling, and chem milling, and hot and cold forming, among other fabrication processes.

Bill Strasburger of Product Support Customer Training and Howard Brochyus of Training and Development coordinated the two-week course. Included in the sessions were shop demonstrations, lectures, and hands-on or actual hardware training. Manufacturing Engineering and Material and Process Engineering provided the instructors.

CALENDAR of events

Notice of events for period May 8 - 22 should reach Plane News by Tues., April 28.

Aquatic Assoc.: Thurs., Apr. 30, 8:30 p.m., Larkfield Suburban Club. Gen. meeting. Films on "Modes of Surfing" & "World of Jacques Costeau." John Reeves, Ext. 2002.

Chess Club: Tuesdays, 5 p.m., Plant 3 Cafe. Tournament, games. C. Wilkie, Ext. 9941.

Coin Club: Wednesdays, 12:05-12:50, Plant 25 Vendor Conf. Rms. Irv Atkins, Ext. 1874.

Duplicate Bridge Club: Thursdays, 5:45 p.m., Plant 3 Cafe. Reserv. not req. Partnerships arranged. Bernard Holland, Ext. 9083.

Ex-Service Men's Club: First Monday of month, 6:30 p.m., Plant 28 Audit. Exec. & gen. meeting. Northeastern Cadet Corps every Fri., 7:30 p.m., Co. A, Cherry Lane School, Carle Place, boys from 10 yrs. H. Dong, Ext. 7525.

Family Campers: Sat. & Sun., Apr. 25 & 26, Calverton picnic area, Sat.: Child. games, adult entertain.; Sun.; 2 p.m., club mtg. Phil Giacini, Ext. 57-247.

Fencing Club: Wednesdays & Fridays, 5 p.m., Plant 30 Cafe. Joe Campisi, Ext. 1134.

Horseback Riding Club: Every Sun., 11 a.m., By-Ways Stables, Round Swamp Rd., Huntington. Caren Carlson, Ext. 2725.

Research Lecture Series: Thurs., Apr. 30, 4 p.m., Plant 35, Conf. Rms. 2A & 2B. Prof. Frank D. Drake, chairman, Astronomy Dept., Cornell Univ., on "The Nature of Pulsars." Secretary, Ext. 2165.

Retiree Club: Wed., Apr. 29, 1:30 p.m., Holiday Manor. Reg. meeting; speaker. GAA, Ext. 2133.

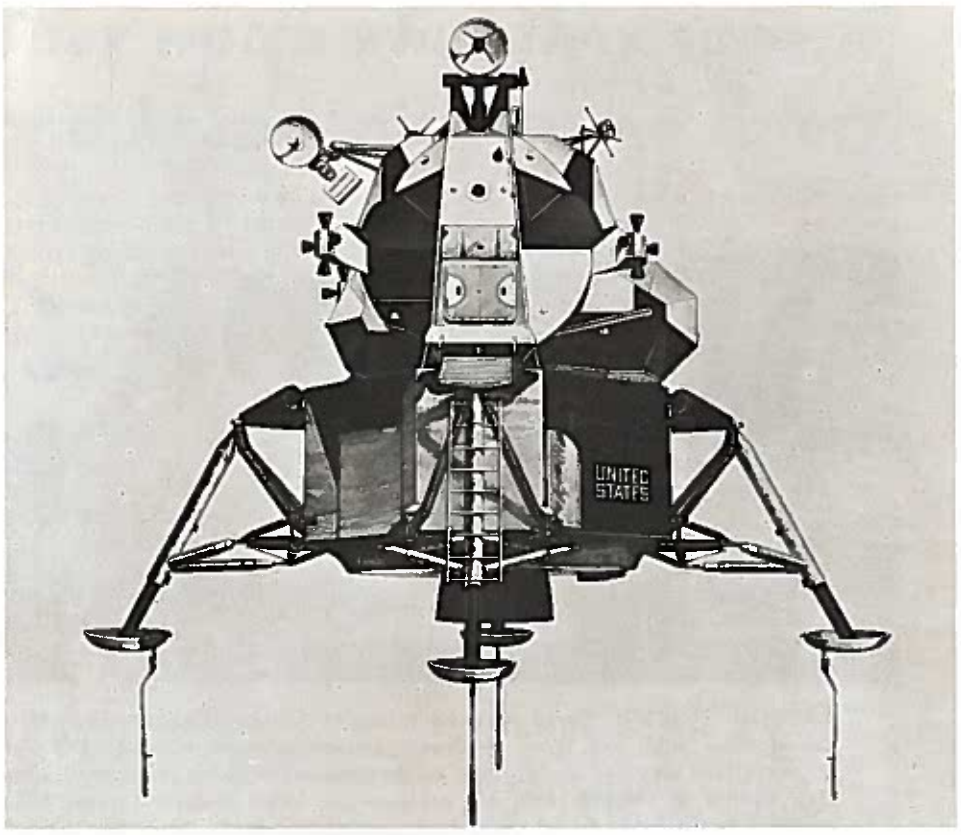
Rod & Gun Club: Wed., Apr. 29, 8 p.m., John's Oasis, Hazel St., New South Rd., Hicksville. Bus. & films. Warren Strittmatter, Ext. 1234.

Soc. of Mfg. Engineers (formerly ASTME): Mon., May 11, Bklyn Poly Grad Ctr., Rte. 110, Farmingdale. Education Night-HS Design Contest awards. Mike Hirsch, Ext. 1012.

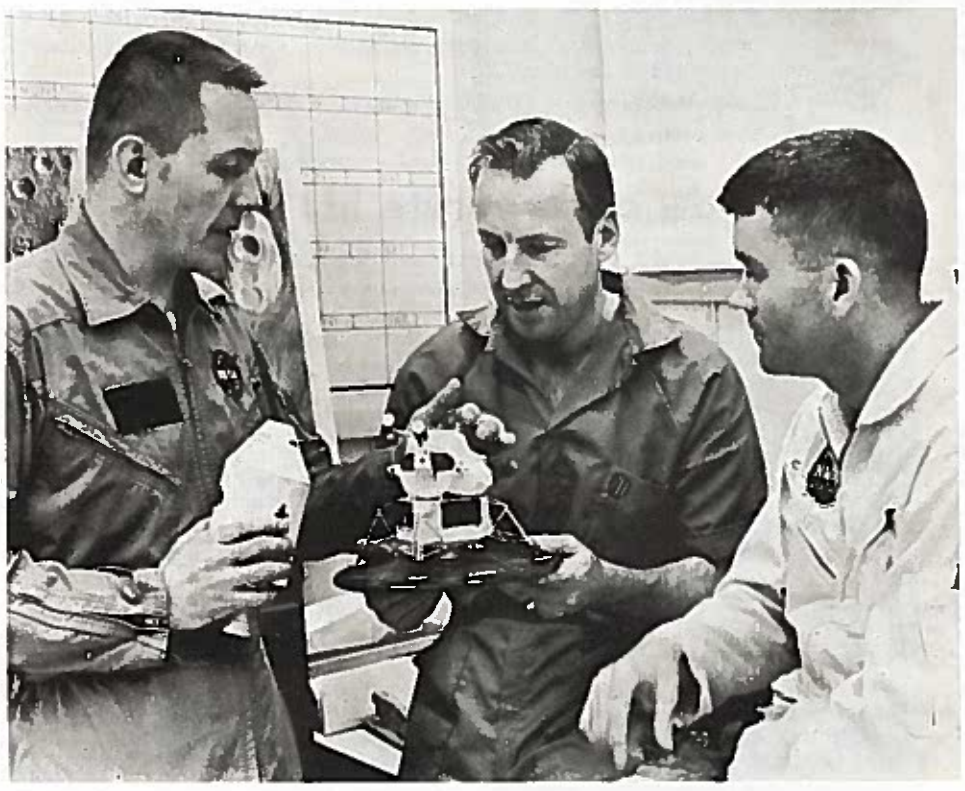
Ski Club: Wed., Apr. 29. Reg. meeting. Bill Brennan, Ext. 3451.

Stamp Club (Bethpage): First 3 Wednesdays of month, 5 p.m., Plant 30 Cafe. Swapping, circuit bk. sales, auctions. Harold Haug, Ext. 3473.

Toastmasters Club: Wednesdays, 6 p.m., Town & Country Diner, Syosset. Pub. speak. prac. Geo. Breen, Ext. 1651.



THE AGE OF AQUARIUS



Cram course. Astronaut Jack Swigert Jr. (L) gets a fast but deep mission briefing from the Aquarius crew, Jim Lovell Jr. (C) and Fred Haise Jr. two days before the Apollo 13 launch. Swigert had to fill in for Tom Mattingly, grounded because of the threat of measles. (Wide World photo)

Support team work

"Hey, we've got a problem here."

That terse message brought the world to attention.

Mission Control in Houston began preparing new flight plans to bring the astronauts home. Months and months of practice "flying" the Lunar Module, in flight simulators and in operational systems testing, had provided the astronauts with the information and experience necessary for landing on the moon.

But never before had the astronauts flown the lunar lander while it was attached to the Command/Service Module. Although the Lunar Module had been envisioned as a possible "lifeboat" since its early development, flying it in that configuration was something else again.

Since the "lifeboat" concept had never been tested in flight, planning by Mission Control had to consider that every critical item in that flight plan would have to be tested, not once but many times, before the astronauts could perform the same maneuvers in space. There was no room for error.

At Bethpage, Kennedy Space Center, and the Manned Spacecraft Center, support teams, on stand-by alert, went on full 24-hour duty. Hundreds and hundreds of engineers and technicians, with the Apollo 13 astronauts only in spirit, began flying the very same mission as Lovell, Haise, and Swigert aboard Aquarius.

Starting early Tuesday morning, teams of engineers, consulting pilots, and technicians began four days of intensive testing at the Full-Mission Engineering Simulator and the Automatic Checkout Equipment station in Plant 5. They had to check out and predict vehicle behavior and flight dy-

(Continued from page 1)

Despite this firmly voiced assurance, the uninitiated—those not in the program and savvy in its operations—may be forgiven a gasp or two. After all, how would you react if some night all power went off, suddenly and inexplicably? And think of that happening to three men in a capsule some 203,000 miles from earth and zipping along toward a scheduled rendezvous with the moon.

And that was the case the night of April 13.

Before that critical power loss, there was no reason to believe that Apollo 13 would be anything but successful. Its predecessors, beginning with Apollo 8 during the Christmas season of 1968, had all performed well—in fact, with increasing reliability as more and more was learned about each voyage. The crews were, without question, superbly trained; and their vehicles seemed to achieve a state of quality close to perfection itself. Indeed, so well did men and machines work together that after the breathtaking Apollo 11 mission—when Neil Armstrong and Buzz Aldrin became the first humans to set foot on the moon—the successful flight of Apollo 12 attracted something akin to a "ho-hum" reaction. And despite calm warnnings from top officials in the National Aeronautics and Space Administration that these successes should not be taken for granted, public opinion polls showed a decline in mission interest, suggesting that success was assumed, by too many people.

NASA and Grumman and the other Apollo contractors fought against this success-gets-dull syndrome; but as missions came with less frequency, interest waned.

However, those on the program did not lag in interest, dedication, or spirit. Morale at the Kennedy Space Center, for example, was reported as high. It manifested itself clearly immediately before liftoff. The crew of Navy Capt. Jim Lovell Jr., mission commander, Fred Haise Jr., LM pilot, and John Swigert Jr., Command Module pilot (a talented replacement for Navy Lt. Cdr. Tom Mattingly who was bumped off the flight because he, unlike the others, had no verifiable immunity to measles), exuded confidence.

Shortly before 2:15 p.m. Eastern Standard Time on Saturday, April 11, the mighty Saturn V roared its way skyward. It was "a pjcture launch," the best ever, reported those on the scene.

All went well that day. It was the same story on Sunday. And Monday looked good, too . . . until about 10 p.m., following a "routine" telecast about their spacecraft that was so routine that the major networks didn't bother to carry it.

Then an astronaut told Houston:

"Hey, we've got a problem here."

Houston was "seeing" it, too.

"We're venting something out into space. It's a gas of some sort," reported Lovell.

Mission Control at Houston later summarized:

" . . . we have an apparent serious problem with a leak in the oxygen in the Service Module which provides electrical power coming out of the fuel cells and also breathing oxygen for the crew. We're now in the process of manning the Lunar Module. Under this alternative mission, the Lunar Module would serve as a lifeboat to bring the Apollo 13 crew back to earth—that is, its consumables, oxygen, electrical power."

The LM (Aquarius), however, was not really designed as a "lifeboat." It was designed as a vehicle to carry two men for three days. It now had to house three men for four days.

That was only part of the problem. Conservation of vehicle resources—especially water—became instantly critical, as did conservation of oxygen, not only for breathing but also for supplying the Command Module's re-entry flight through the earth's atmosphere to splashdown in the Pacific. Normal navigation techniques—sighting of stars—were out of the question because the gas being vented as a result of the bursting of the Service Module tank

'd 'round the clock

namics of the LM/CSM spacecraft, and ways to accomplish the flight.

It was a new ball game, with new ground rules—ground rules that had to be established in simulators such as the FMES and the Plant 5 ACE station. Flight maneuvers, engine burns, and changes in spacecraft attitude had to be duplicated on the ground before the astronauts could attempt the same maneuver in space.

In the Full Mission Engineering Simulator, for instance, data programmed into a 7094 computer provided a real-world evaluation of expected LM performance in terms of guidance, navigation, and control in the various maneuvers planned for Apollo 13. Slight variations or modifications of the same maneuvers were also tested so that the best possible maneuvers could be recommended to Houston.

At the ACE station it was much the same. On the final assembly floor of Plant 5, LM-9 was tuned in and turned on to duplicate LM-7 in space. So were the engineers, technicians, and consulting pilots who form the LM-9 Spacecraft team. It was their baby, and the conditions in Aquarius were duplicated on LM-9.

The Lunar Module was supplying power to the crippled Command/Service Module during the return flight, a condition that's hardly normal operating procedure. What, for example, would happen when the power was disconnected as the astronauts transferred for good to the Command Module? Would there be any unforeseen difficulties? Such situations were worked out far in advance of the actual happening—again with modifications—so that ground control could predict how each system aboard Aquarius would react.

clouded the spacecraft windows and particles of debris "ran along" with the ship, creating the illusion of stars: And how do you separate the phony stars from the real ones?

Still another problem was heat for the astronauts and the equipment vital to a safe return. As things turned out, the equipment didn't freeze and was fully operative; but the astronauts found themselves flying, uncozily, in an out-of-this-world refrigerator.

On top of all this was the overriding question for the astronauts: How, specifically, do we get back home?

That chilly question absorbed the minds of millions.

The NASA-Grumman team was absorbed with action. While Grumman's LM project engineer at Houston, Will Bischoff, assisted by Gray Smith and John Devaney and their crews, was tieing in tightly with NASA and Bethpage, a highly coordinated effort was in motion at Plant 25's Mission Support Room (where some 75 people worked around the clock) and at Plant 5 (where LM-9 was used many times for simulation test procedures).

That Houston-Bethpage "hot line" was always wide open.

A sort of "insurance policy" was brought into being on that tense night of Monday, April 13, when Dr. Ralph Tripp, director of LM, put in a call to Howard Wright, deputy director of LM, taking management courses at Harvard Business School. Wright immediately called Tom Kelly, assistant director of LM Engineering, who was taking similar courses at the Massachusetts Institute of Technology, and together—after Tom Harding of LM Logistics somehow found a plane (a Cessna 310) at Boston's Logan Airport — they were flown to Bethpage, where, at about 3:15 a.m., Tuesday, they got to work helping Joe Marino in the Mission Support Room.

What Marino, Wright, and Kelly did was to "dust off" a two-year-old computer program and update it by plugging in current information. And of course, Bethpage was feeding Houston with mission alternatives, checked out by simulations.

It sounds so simple!

But it wasn't. Life-and-death decisions rarely are.

The NASA-Grumman team had to act fast, and it did. Crisp commands from Houston went out to the battered spacecraft:

- Plan for a loop around the moon to make the more than 300,000-mile trip home
- Feed oxygen into a reserve tank and hook up emergency batteries to the navigation system gyros
- Turn off battery power in the Command Module, for that would be needed during re-entry into the earth's atmosphere

Aquarius, then, picked up the whole load. The Service Module was stricken and the Command Module would be dormant until immediately before re-entry.

Now came the time for alternative approaches to get the men home—if that were possible. And that possibility depended in large measure on just how well Aquarius did its jobs. With the gnawing knowledge that failures can occur, and time was critical, the Apollo team gathered to consider strategy.

There were four basic routes open. One was a "free return" procedure; a second was a so-called "super-fast return"; a third option was to bring the men down in the Atlantic; the fourth was a Pacific splashdown on the 17th.

After many hours of intensive study, "free return" was ruled out because, first, 10 hours would be added to the trip, and, second, the landing would be in the Indian Ocean, an area thin on recovery vessels and aircraft. A pair of problems knocked out the "super-fast return" thought: LM would have to be fired almost to depletion (possibly making mid-course corrections impossible), and the Service Module would have to be detached early, leaving the Command Module a possible victim of damaging ultraviolet rays. A splashdown in the Atlantic suffered from the same problem as did the Indian Ocean alterna-

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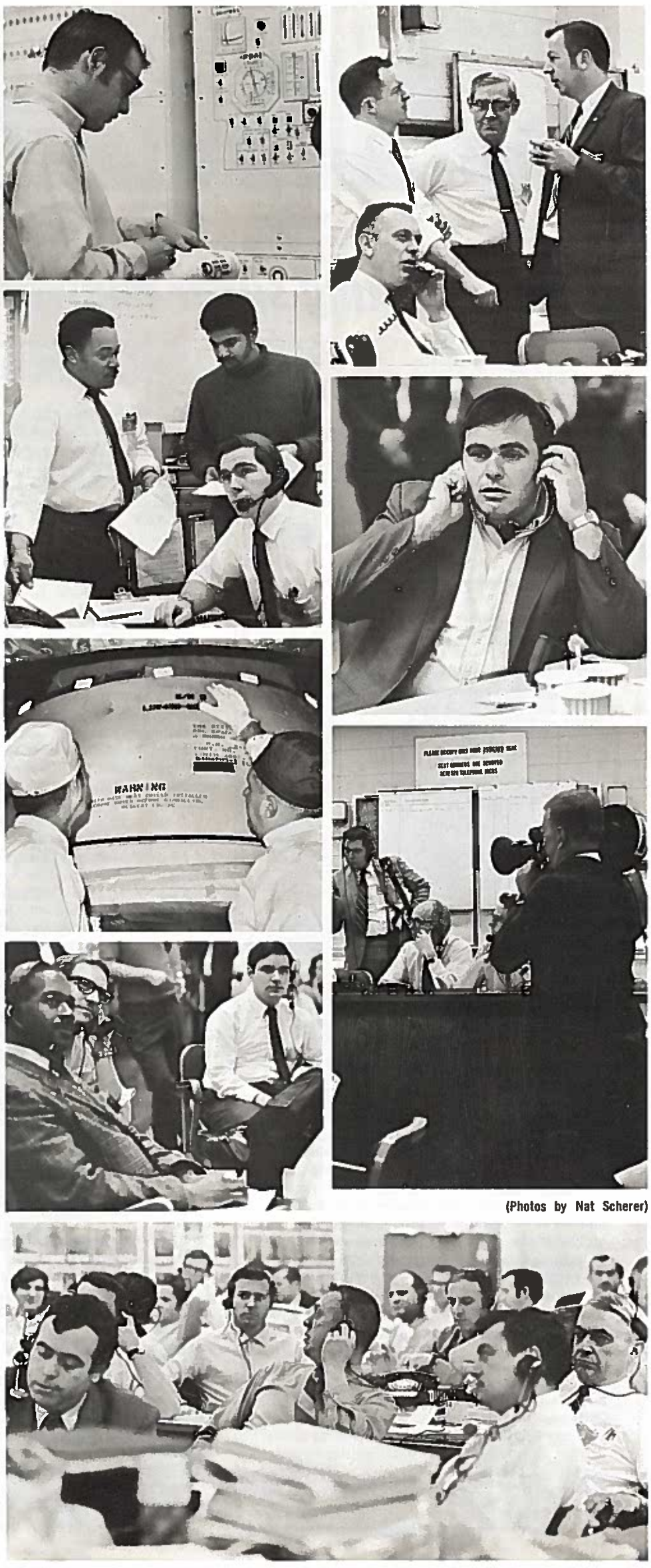

(Photos by Nat Scherer)

S. P. Marchioli
Sub-Assem.

E. T. Anderson
Mfg. Tech.

L. Pizzo
Tanks & Ducts

E. A. Nelson
Wing Sub.

W. A. Treadwell
Meth. Engg.

J. W. Sichler
Instr. Test

T. M. Murphy
Flt. Avionics

C. R. Thomas
Mfg. Tech.

L. S. Leiser
Tool Fab.

Fifteen marking silver anniversaries with Company in April

Five men complete 30 years with the Company this month and will be wearing new anniversary pins with six blue sapphires while 15 joining the Grumman Quarter Century Club will be eligible for Silver Anniversary watches.

The anniversary roster for April includes these 30-year men:

George Tiber, deputy director of Production, Plant 2; William J. Pepe, supervisor, Honeycomb and F-111 Production, Plant 3; William F. Hejl, Controls, Plant 29; Jacob Friedl, Static Test, Plant 31; Byron Heinecke, foreman, Electrical/Electronic Test, Plant 33.

The 25-year roll includes one woman and 14 men:

PLANT 2: Stephen P. Marchioli, Sub-Assembly; Elon T. Anderson, Manufacturing Technology - Formed Parts.

PLANT 3: Louis Pizzo, Tanks & Ducts; Edward A. Nelson, Wing Sub-Assembly.

PLANT 5: William A. Treadwell, Methods Engineering - Electronic.

PLANT 6: Jacob W. Sichler, foreman, Instrument Test; Thomas M. Murphy, Flight Avionics.

PLANT 11: Charles R. Thomas, Manufacturing Technology - Formed Parts.

PLANT 16: Leslie S. Leiser, Tool Fabrication - Templates.

PLANT 17: John L. Boriotti, Shipping & Spares Consolidation.

PLANT 27: Edward Terribile Jr., Production Control - Parts Control Detail.

PLANT 30: Stephen I. Austin, Facilities Maintenance Administration.

PLANT 33: George Mancuso, asst. foreman, Propulsion Installation, and Edith C. Kerbs, Avionics Management & Staff.

PLANT 35: George J. Kubicke, P/S Technical Writing.

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Twelve men and one woman are celebrating 20 years with Grumman.

PLANT 1: Paul F. Langhauser, Vehicle Producibility Engineering.

PLANT 3: John G. Hoffman, Parts Paint.

PLANT 5: James W. Potter Jr., Final Assembly; Joseph P. Armstrong, Inspection - Mechanical; Dorothy M. Wesnofske, Public Affairs.

PLANT 6: Robert W. Pettit, Instrument Test.

PLANT 17: Nickolas Munzing, Spares Material Consolidation.

PLANT 19: George P. Mina, Structural Designers.

PLANT 23: Otto K. Hertel, Static Test.

PLANT 25: Gene W. Harms, Crew & Equipment Integration.

PLANT 27: Alex Slawata, Nacelles.

PLANT 36: Robert L. Houston and Angelo Pomponio, Final Assembly.

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Two women and 38 men are celebrating 15 years with Grumman:

PLANT 1: Anthony Collura Jr., Machinery Engineering.

PLANT 2: Joseph E. Komp, Drop Hammer; Charles W. Merchant, Plant Stores & Distribution; James J. Gannon, Intra-Plant Transportation; Mary Tessari, Tool Fabrication - Acct./Tool Control; Winslow W. Peters, Mfg. Technology - Mechanical Process.

PLANT 3: Robert W. Clair, Machine Operations - Parts Control; Roland R. Gibson, Facilities Maintenance Administration.

PLANT 5: Stella Krupa, Food Services; Stephen G. Bellanca, Adv. Civil Systems; George P. Scheuerlein, Engineering Operations Administration.

PLANT 6: George E. Stolworthy, Repair Control; George R. Petheram, Engineering - Special Project; Harold J. Hobel Jr., Facilities Maintenance.

PLANT 7: Kenneth J. Walch, Quick Response Center; James V. Digilio, Projects - Aircraft; Theron J. Montoux Jr., Vehicle Instrumentation.

J. L. Boriotti
Spares Consol.

E. Terribile
Prod. Contr.

S. I. Austin
Facil. Maint.

G. Mancuso
Propul. Inst.

E. C. Kerbs
Avion. Mgt.

G. J. Kubicke
P/S Tech. Writ.

PLANT 10: Valentine F. Klein, QC Laboratory.

PLANT 11: Homer W. Roberts, Tool Fab - Plastic Tools.

PLANT 12: John Derr, Walter Sternberger, and Charles F. Morris, Facilities Maintenance.

PLANT 15: William Borruso, P/S Program Management; Charles B. McLaughlin, Aero Configuration.

PLANT 25: Leslie P. Wittekind, Structural Test Engineering; Frank P. Marciniak, Proposals - Advanced Projects.

PLANT 30: John J. Breen, General Purchasing; Arthur Berman, Facilities Business Management; Frank J. Gaertner, Accounting Staff.

PLANT 33: William J. Cody, Avionics Installation; William F. Prinz, Facilities Maintenance.

PLANT 35: Robert J. Kennedy Jr., Structural Mechanics; James H. Boyd, Engineering Planning & Control.

PLANT 36: Gilbert M. Beanland, Facilities Maintenance.

PLANT 39: Daniel G. Chalich, P/S Verif. & Product Support; Gerard Cudone, Power Plant Design.

PLANT 52: Edwin F. Carle, MSC Technical, Houston.

PLANT 81: Gerald D. Markham, P/S A/C Systems Service, Seattle.

PLANT 88: John A. Boyle, Production, Pt. Mugu.

PLANT 89: Arthur H. Meyer, Quality Control Supplier, Jarrettsville, Md.

Carrier tale

Veteran pilots returning from a mission are likely to describe the task of locating a carrier at sea as somewhat like looking for a postage stamp in the middle of an ocean. Imagine then how Ron Markey felt. Not only had he never landed aboard a carrier before, he had never even seen one up close.

Ron is an Air Force major on exchange duty with VX-4 at the Naval Air Station, Pt. Mugu, Calif. You might well imagine his having **some** trepidation when he had to fly out and make his first landing at sea aboard a carrier as part of his exchange tour. He didn't let on exactly how he felt, but one thing's certain—he did bring in a Grumman S-2 for an arrested landing aboard the USS Oriskany and he's got a "tailhook" plaque presented by his VX-4 Navy buddies to prove it. And to make it more binding, the landing proved to be the 150,000th aboard the venerable carrier.

Sign-up time

The Over Forty Club (that sounds like discrimination) is looking for new members and hopes to sign up old members for the 1970 term. According to Frank Mistretta of Plant 2, anyone over 35 can apply. Interested? See Ed Hartmann, Production Control, Plant 2; Doc Scheinberg, Jigs and Fixtures, Plant 2; Frank Cava, Honeycomb, Plant 3; or Pete McCormick, Main Tool Crib, Plant 3.

Gals got it in the bag

Grumman's women varsity bowlers are rolling towards their third straight title in the L.I. Industrial tourney with a good chance of breaking the all-time record for total pins.

They reached a 427-pin edge over Sperry at the halfway mark with 5,284 sticks last week, and also pace the Incentive division with a plus of 346. Grumman shot 2,634 with Norma Frey hitting 216-543, Chin Thompson 556, and Bertha Siegl 552. Siegl was also the opening round star with 554 when Grumman shot 2,656.

In the Industrial Nite Owl event the Grumman Hellcats rank fifth with the Mohawks five sticks behind. Judge Locke of the Mohawks rolled 231 and 619 last week, and John Santangello led the Hellcats with 548. In the previous round, Ernie Jenkins had a 633 series and Rudy Dunkley rolled 621.

Collegians pass test

Hal Manaskie's Collegians have graduated with honors from the Tuesday night basketball league at Bethpage.

The Collegians won the crown and ended the cage season in a stormy, sizzling 118-117 overtime victory over the Newcomers at the Kramer Lane school. It was the second straight win in the playoff final for the Collegians, who earlier had beaten the Newcomers, 108-102.

The Collegians rallied from a 10-point deficit in the first quarter to go ahead at the intermission by 55-47. But from then on it was a ding-dong battle down the stretch as the Collegians and Newcomers hit the wire at 107-107. Manaskie carried his club to the title in the overtime with four fouls and a field goal.

Scoring honors were shared by Manaskie and Frank Quarto of the Newcomers, both netting 39 points. Gary Pike played a big hand in the Collegians' win with 33 tallies, while Ed Krol had 26 for the losers.

Seeing action with the Collegians, in addition to Manaskie and Pike, were Bob Scully, John Ebron, Mike Sabia, Bob Hieter, Stu French, and Don Martinolich.

They're racket kings

Several more rulers have been linked up in GAA table tennis.

At Calverton's Plant 7, Alan Eccles won the singles title in two showdown matches with John Goff. Eccles beat Goff in the winners' bracket finale, 21-14, 21-14. Then Goff ousted Martin Almberg, 21-17, 21-17, only to lose the title playoff to Eccles, 23-21, 21-19, 21-19.

Almberg teamed with Pete Guido to win the Plant 7 doubles, defeating Eccles and George Haddad in two tough matches, the first by 15-21, 26-24 and 21-19. After Eccles and Haddad fought back from the losers' bracket, Almberg and Guido won again, 21-17, 14-21, 23-21, and 21-13.

Lionel Wellington, runner-up in the singles to Tony Campagne at Plant 33, Syosset, broke into the ranks of the elite when he teamed with Pat Courtney to win the doubles crown. They twice defeated George Wilson and Gottfried Kneips, first by 17-21, 21-15 and 21-15, and then in the second test of the double elimination tourney by 17-21, 21-17, 21-17, and 21-13.

Arthur Schwartz won the day shift singles in play involving Plants 11, 11A, and 16. He defeated Frank Curcio in the final by 17-21, 21-13, and 21-18. The Nite Owl section of this event was won by Ira Allred, who defeated Griff Evans in the title match, 21-17, 21-19, 21-17.

Scura, McLaughlin 'stickouts'

Cosmo Scura and George McLaughlin took their cues and caromed their way to the title in the Grumman Pocket Billiards League. They racked up 1,737 points in the 10-week schedule against 1,570 for the runner-up combination of John Dudonis and Bill Tuttle. George Massey won the high-point trophy for "A" players, and George Barnes was the leader in the "B" ranks.

Target titans

Ed Moles and Cliff Wright have added considerably to Grumman's sharpshooting fame by collecting a shiny array of prize hardware in two major meets.

Moles, who shoots for the Grumman Hawkeyes and the Center Fire team, swept six first-place awards in the N.Y. State Indoor Pistol Championships while competing in the Marksman class. He won timed fire, .38 cal.; national match, .38 cal.; center fire aggregate (civilian); rapid fire, .45 cal.; aggregate, .45 cal.; and grand aggregate (civilian).

Wright, competing in the Sharpshooter division of the National Sectional rifle meet at Cos Cob, Conn., won three events. This meet is for the New York-New England area, and Wright took first place in prone, kneeling and aggregate. He shot 199-14X in the prone competition.

In L.I. Industrial competition the pistol spotlight was on the Grumman Hawkeyes, who upset the pace-setting Grumman Gulfstreams by 33 points, with Fred Wicks posting high score of 277. The Gopher rifle team beat Plaza, 963-909, in the South Shore circuit, with Joe Moks and Dick Imgram both hitting 195.

Varsity tee party

The annual varsity golf trek, a 54-hole hike at Bethpage State Park to decide the makeup of the Grumman team competing in the L.I. Industrial League, will get underway on Wednesday, May 13. Succeeding rounds are scheduled for May 18 and 20.

Only Grumman golfers with handicaps of 10 or under are eligible to enter the tryouts. Their handicaps must have been established in leagues or as members of clubs with regulation layouts.

Varsity berths will go to the eight low medal players in the three 18-hole rounds. The field will be cut to 16 after 36 holes. Play will be held on the Red and Black courses at Bethpage.

Entries, in writing, are to be forwarded to Mike Cherry at the GAA office, Plant 28B, by May 1. Registrations must include name, permanent number, department, plant, telephone extension, handicap, and the name of the league or club where the handicap was attained. Cherry may be reached on Ext. 2269 of 2133.

For the tennis squad, Coach Mitch Rosenbaum has already announced that tryouts for the varsity team have been scheduled for May 4 and May 8 at Bethpage State Park, both sessions starting at 5 p.m. Rosenbaum is situated in Plant 36, Ext. 6213.

First ball toss May 4

Opening day for Grumman lunch-period softball will be Monday, May 4, according to schedules drafted by Chet Baumgartner of the GAA.

The league lineup this season indicates that the trend is to "after-hours" play rather than the traditional lunch-period competition. Last week Baumgartner said he expected about 84 teams in action, with 53 of these assembled for the "after-hours" leagues.

Eight leagues are on the lunch-period schedule, with play listed at Plant 1, Plant 3 (both lunch periods), Plant 5 (using the Plant 2 field), Plants 6 and 7 at Calverton, Plant 27 in Wyandanch, and the Bethpage Nite Owl circuit, which uses the lights at Plant 2 and includes clubs from several neighboring plants.

The "after-hours" competition will get underway June 1, with the ball-tossing slated for Monday through Thursday nights. These Bethpage circuits are loaded with teams, so much so that, with the exception of Thursday nights, the leagues will have to be split in two divisions.

Give 'em a tumble

Have you been belted yet?

Well, the Grumman Judo Club is looking for some experienced players to join in the fun as they meet every Wednesday night at Commack High School on Vanderbilt Motor Parkway. All the club members are graded, and there is no fee to participate.

Bill Toolan of the Shuttle Program, Plant 25, heads the group and he may be reached on Ext. 2064 or 84382.

George Druhak of the F-14 Program, Plant 1, is the club instructor, and may be contacted on Ext. 9563.

He's a Black Belt.

Grover in groove

Grover Hart, long a Grumman bowling star, reached right up to the sky in Outpost league tossing, soaring to a 691 series on splurges of 225, 244, and 222. The Outpost circuit was jumping that night, for in the same round Pete Van Putten cracked the loop's game record by a single stick with a 256. . . . Dick Lindstrom was practically handing out cigars in the Patchogue Mixed: he smashed both men's marks with 257-668. . . . Lennis Scaturro knocked Judge Locke off the top rung of the series ladder in the Nite Owl league, delivering a record 667 with a high of 233. . . . Ronnie Bose joined in the record-wrecking by rolling 256 for the last-place Pickups in the Brown circuit. . . . Jack Nielsen, star for Grumman in the Industrial tourney, took over first place in the individual Masters competition as he socked a four-game 860, including a 254. In the previous round Cliff Hartnack rolled 878 with a 254. . . . Tom Wright made the big Trader noise with a 653 explosion. . . . Walt Becher joined the trophy club in an earlier Trader session with a 253. . . . Herb Pirkl missed the "250 Club" by one stick in the Red League. . . . Summer action starts May 20 at Syosset when the Rainbow Mixed opens, and prexy Joe Cardello is looking for keglers. Contact Joe on Ext. 1776, Peggy Smith on 7062, or Judy Davis on 87271.

International item

Grumman's soccer squad didn't have a very good day against Manchester University of England last week, and now they must face the Black Knights of the USMA.

The booting boys make their annual pilgrimage to West Point tomorrow (Saturday, April 25), and are again expecting a heavy bombardment.

The Manchester University team, on a short tour of the U.S., has been making a striking impression, losing only one game in six starts. That last victory was at the expense of Grumman, 8-1, in a special exhibition played during the lunch periods at the Plant 3 field.

The outcome was simply a story of age and condition. Grumman took an early 1-0 lead on a goal by Denis Fekete, who was assisted by both Allan Grillo and newcomer John Castle. Manchester edged into a 3-1 half-time lead, but then "Father Time" caught up to Grumman and the collegians from abroad zipped to a one-sided decision.

The Manchester squad, headed by Coach Harrold Hassall, was guest of Grumman at a luncheon following the game. . . . Previously they had been escorted on a tour of the plants. Pat Ryder, president of the L.I. Soccer League, was among the guests.

In an earlier game, the Grumman Reserves were beaten 5-1 by Flushing-Holland and eliminated from Edwards Cup competition. Joe Campisi scored the Grumman goal on an assist from John Castle.

Allred, Maibach push to title

Ira Allred and Chet Maibach have staged a big push in GAA competition. They teamed to win the shuffleboard tourney which included entries from Plants 11, 11A, and 16. Second place awards were taken by Bill Daniels and John Hinde.

(Photos by Nat Scherer)

The Age of Aquarius . . .

(Continued from page 5)

tive: a dearth of recovery vessels.

(It must be mentioned, however, that almost 15 nations offered their naval services should splashdown occur outside of the primary recovery area. Thus, rescue operations took on a friendly international flavor.)

So, in spite of very stormy seas in the target area in the Pacific, the decision was made to land there, not just because of the concentration of ships there but also because meteorologists predicted that the storm would be over by the time the astronauts got there on Friday, April 17. The weather forecast proved to be accurate.

In any event, at about 3:45 on the morning of April 14, Aquarius' engine was fired in order to loop the moon and head it toward earth. About six hours later, long after the looping maneuver took place, a four-minute and 24-second burn was done and Odyssey, Aquarius, and the enfeebled Service Module were pointed toward the Pacific where the aircraft carrier Iwo Jima and its support ships were waiting.

Houston told the astronauts—and the world—that both burns were "good." But it was still a long way home.

The outwardly confident mission controllers knew, perhaps better than anyone else, that problems might still crop up. Indeed, on Wednesday the 15th, Deke Slayton, chief of flight crew operations at Houston, spoke the tones of realism:

"We've got things well under control. If things keep going the way they are, we are in beautiful shape." And he then cautioned that "you can't discount" the possibility that something could go wrong. Some potentially hazardous maneuvers lay immediately ahead . . .

One went excellently that night: A 15-second firing slowed the Apollo by 7.6 feet per second and thereby put the spacecraft right in the "corridor" for splashdown. If that course correction had not been made, the astronauts would have missed the earth by about 100 miles and skipped off into outer space.

And for those who nurtured the mistaken notion that from here on in it was simply child's-play, well, think again—for the trickiest maneuvers were yet to come. To make it home safely, the astronauts — by this time thoroughly chilled, weary, and wearing extra garments—had to go back to the long-inactive Odyssey and get the power on, cast away the hobbled Service Module, and then get rid of their refrigerated lifeboat, Aquarius. All indications were that only the Service Module had been seriously damaged; the LM had been functioning well; there should not be any problem in repowering Odyssey; and the critical heat shield apparently had not been scarred.

After having fired a rocket to achieve an exact landing in the re-entry corridor, the sequence started — and went flawlessly. The SM drifted away after Swigert triggered the explosive bolts that connected the two modules and Lovell fired a brief rocket blast. This came at about 8:15 a.m. Friday, April 17. Then they photographed the SM and Lovell commented:

"There's one whole side of the spacecraft missing." He said later, "It's really a mess."

At about 11:43 a.m., the LM was jettisoned. From Mission Control in Houston came the tribute:

"Farewell, Aquarius, and we thank you."

It had, indeed, been the lifeboat.

The astronauts in Odyssey were many miles from earth and closing fast. They zoomed into the re-entry corridor . . . and there was the usual communications blackout . . . and people waited . . . and waited . . .

At 12:59 p.m., one of the astronauts said simply, "Okay, Joe."

Then the orange-and-white parachutes were sighted. Lazily they descended, and at 1:07:44 p.m. Eastern Standard Time the module splashed down just 800 yards from their target point.

The taut tension slowly subsided.

What of the Apollo 13 mission? In terms of its objectives—landing on Fra Mauro, setting up experiments on the moon, drilling three 10-foot holes in the lunar surface, and so on—obviously it was a failure. On the plus side—in addition to saving the lives of three astronauts—there's a documented story of successful improvisation, teamwork, the values of training, the wisdom of providing for a multitude of contingencies, and, too, a testimonial to raw courage.

Hotline to Houston

The "hot line" between Grumman's Mission Support center at Bethpage and the Manned Spacecraft Center in Houston was open last week during the combined effort to bring the Apollo 13 astronauts safely back to earth.

Reason was that some 60 Grumman engineers and technicians, all specialists in the construction and capabilities of LM-7, were serving as a critical support team at MSC, working directly with the NASA flight controllers.

Grumman maintains a regular staff at MSC under the supervision of Area Director Jack Buxton, and this group was bolstered by 25 additional LM people from Bethpage. Their mission was in the Spacecraft Analysis Room and Mission Evaluation Center.

The Grumman team working on spacecraft analysis was headed by senior representatives William Bischoff and Gray Smith, while John Devaney and Frank Elliot led the mission evaluation team.

Report from the Cape

KENNEDY SPACE CENTER—The main job here at the Cape—extensive and thorough pre-launch checkout of LM-7—had been done.

"As soon as Apollo 13 lifted off the pad, we assumed a monitoring role in support of the mission," said Vice President George Skurla, Grumman manager of Operations at KSC. "Although our critical obligation to the Program and to the Company was in committing LM-7 to launch, our KSC team also participated with MSC in working out necessary emergency procedures.

"It was kind of a scary mission, but Aquarius came through in a life or death situation," Skurla continued. "Total interest in the Apollo Program on the part of the public had been waning, but when we ran into that incident up there, it turned the whole world on.

"In a positive sense, the incident proves that we can go into space and be prepared to handle emergencies like this one through the combined ingenuity of our test pilot astronauts and the Houston ground flight controllers. And it also proved LM one helluva bird, performing magnificently above and beyond the call of duty and guarantees. This whole incident has to be one of Grumman's shiniest hours."

Skurla had warm praise for "the whole Grumman LM team—Bethpage, MSC, and the Cape—and all our associate contractors." Asked if LM-8 looks just as good, he quipped, "Y-e-s, the old 'Grumman Garage' really turns out outstanding hardware." And then in a somewhat more serious vein,

"I think the public came to the sudden realization that it's not as easy as it looks, and in a moment of time, things can suddenly change from 'real easy' to something very drastic. We realize that if the blowout of that LOX tank had occurred about 40 hours later, when the two spacecraft were separated, all would probably have been lost.

"So in that sense we were most fortunate. And again, over all, I feel we learned something. We had an opportunity to prove we can react to a critical emergency in space, and, by getting ingenious, pull everything together to effect a recovery and bring the crew back safely to earth."

plane GRUMMAN news

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